



US Serial No. 10/626,209
Docket No. E2002-700019
Inventor: Irving DeVoe
System and Method for Converting...

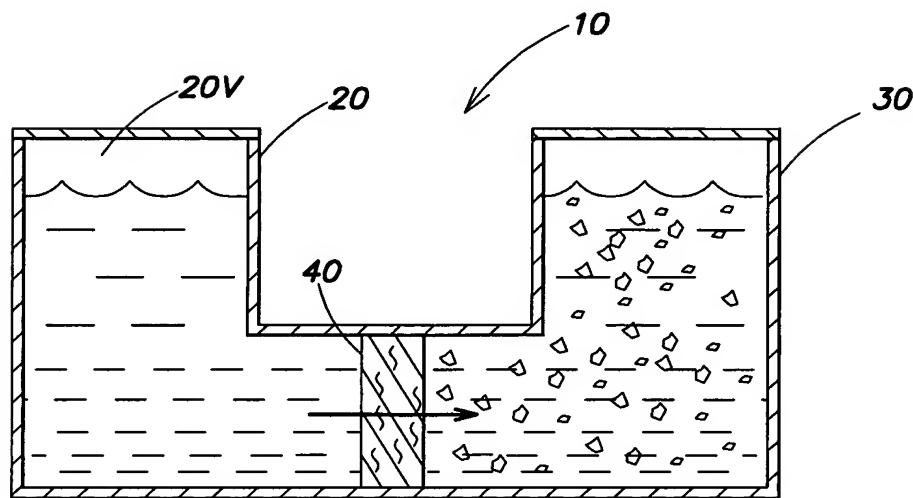


FIG. 1

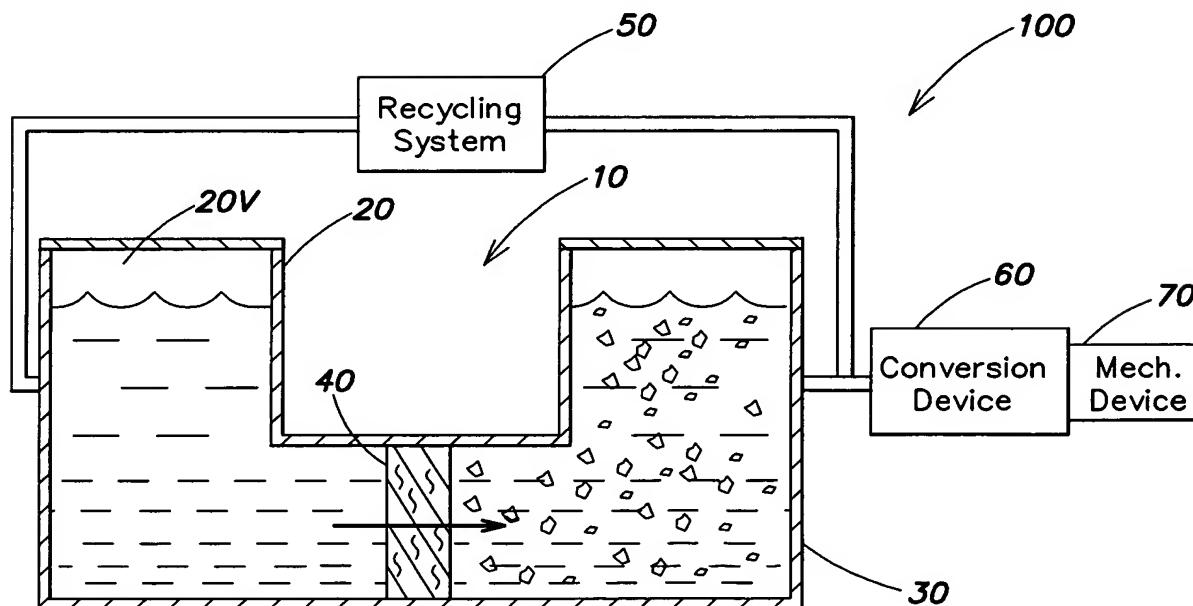


FIG. 3

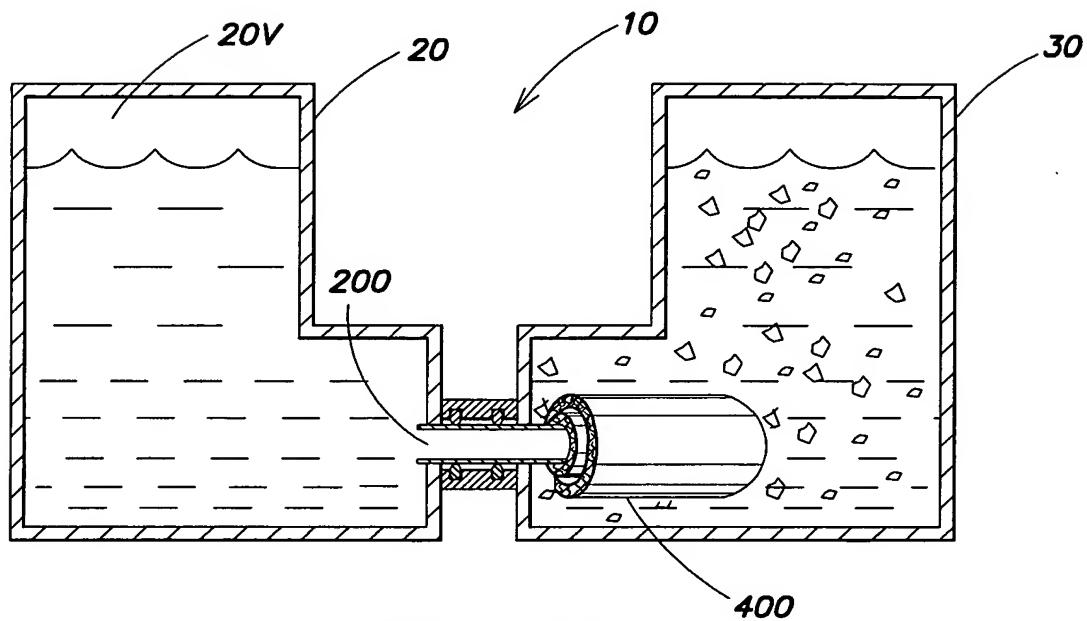


FIG. 2A

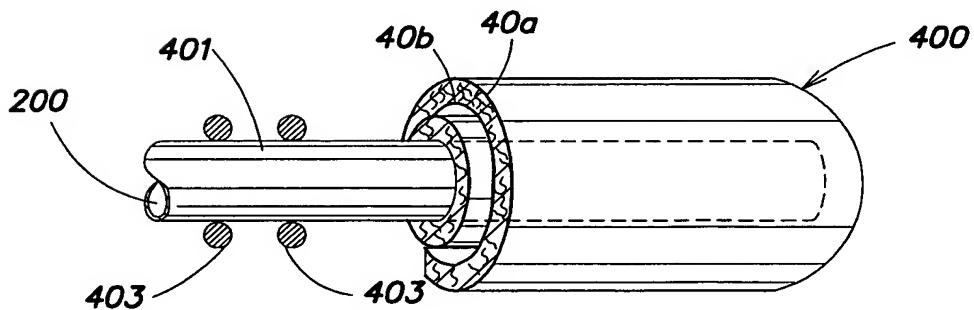


FIG. 2B

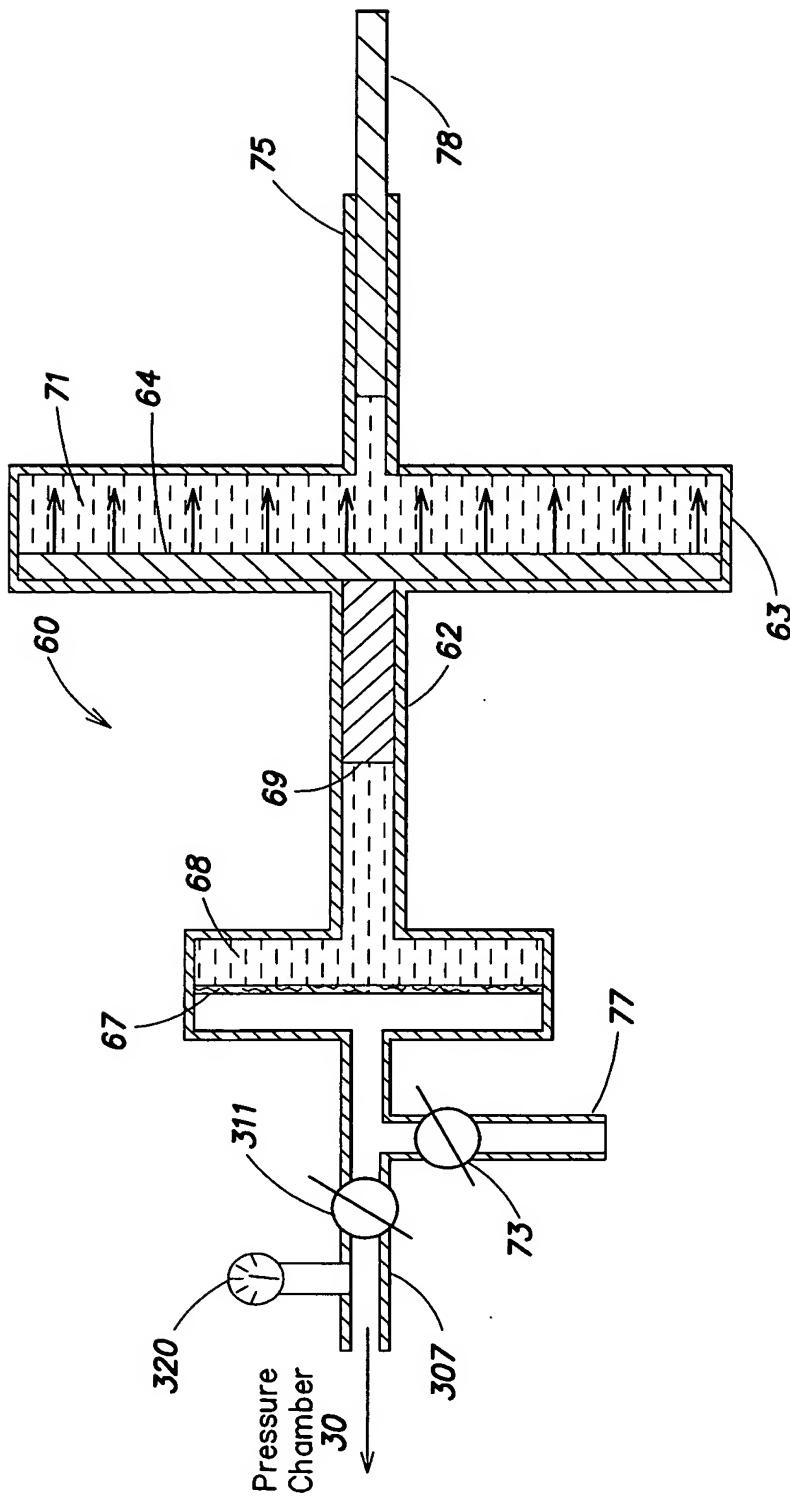


FIG. 4

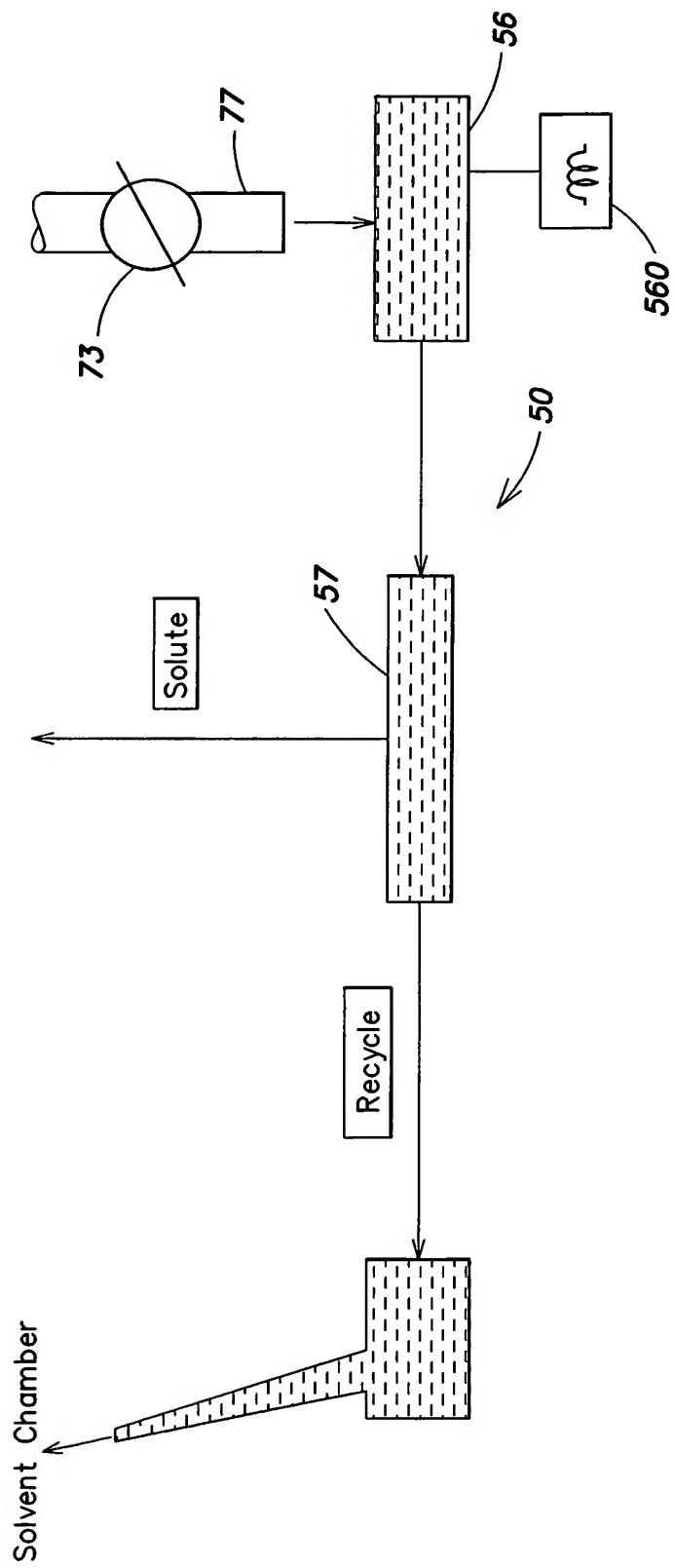


FIG. 5

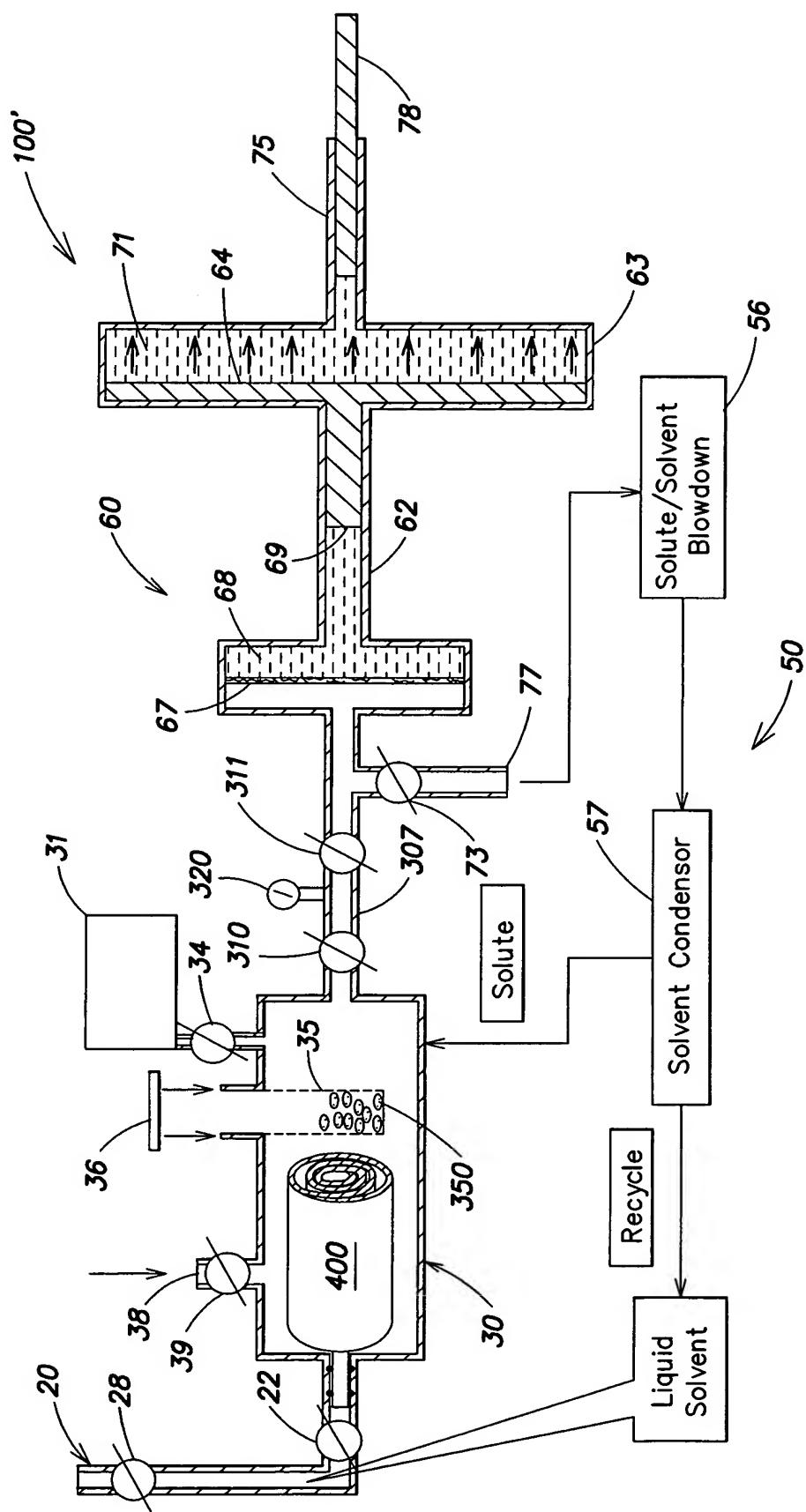


FIG. 6

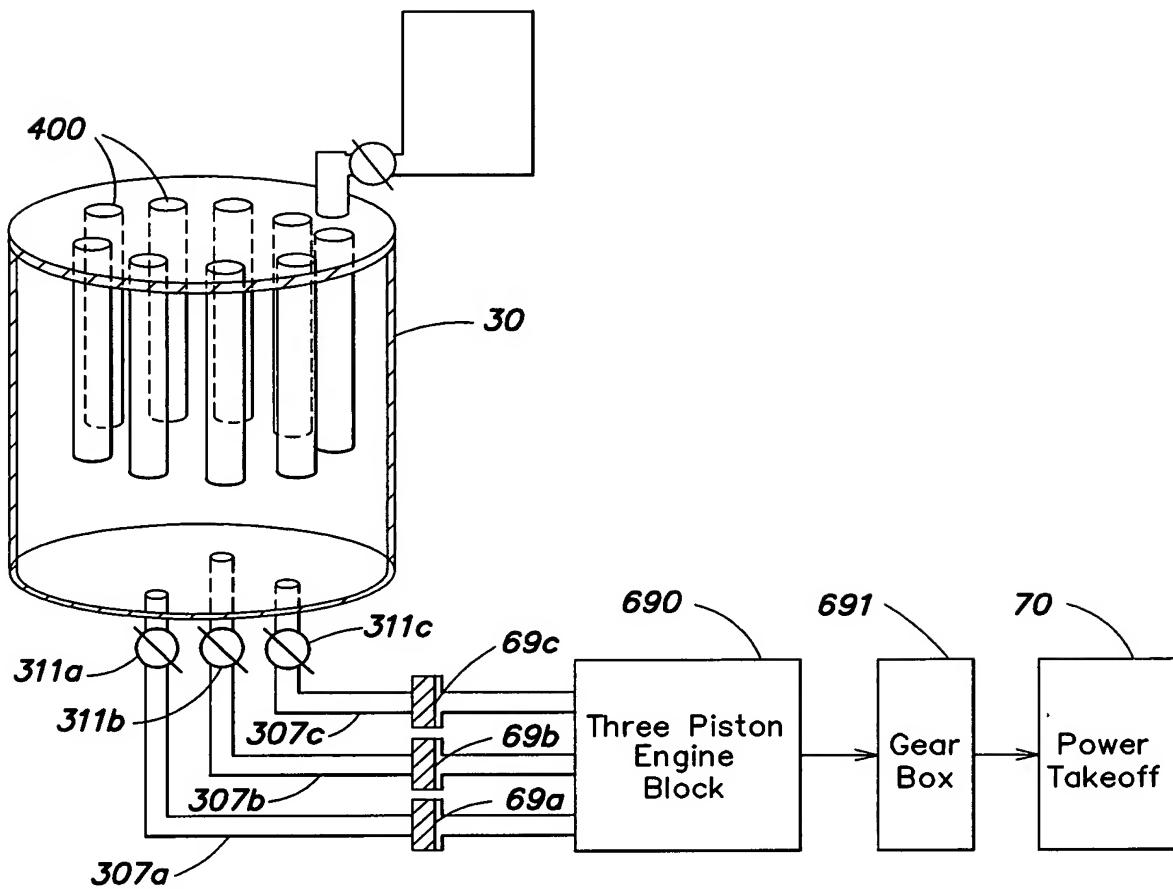


FIG. 7

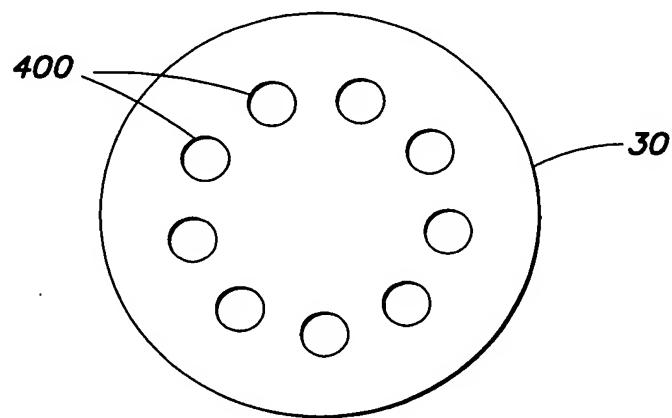


FIG. 8

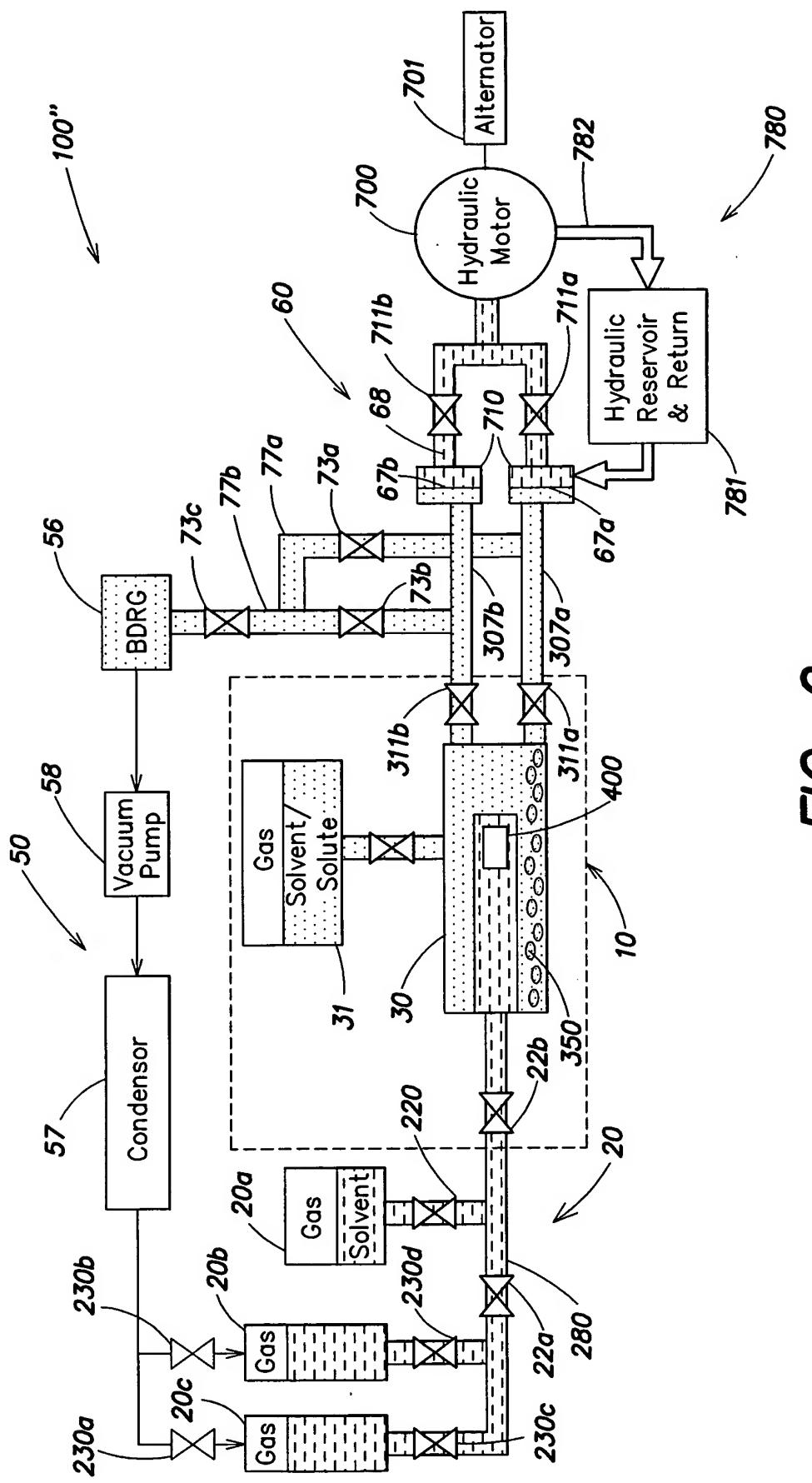


FIG. 9

	AlCl3.6H2O	AlCl3	Sucrose	NaCl	LiCl	FeCl3H2O	FeCl3	
H2O	Methanol	H2O	H2O	H2O	Methanol	H2O	Methanol	
Density solvent	1.000	0.791	1.000	1.000	0.791	1.000	0.791	
Solvent molecular weight	18.0	32.0	18.0	18.0	32.0	18.0	32.0	
Moles solvent in 1 Kg	55.6	31.2	55.6	55.6	31.2	55.6	31.3	moles
Concentration of pure solvent	55.6	24.7	55.6	55.6	24.7	55.6	24.7	mol/L
Heat capacity, Cp	4.18	2.00	4.18	4.18	2.00	4.18	2.00	$\text{J K}^{-1} \text{mol}^{-1}$
Heat capacity, Cp	1.00	0.48	1.00	1.00	0.48	1.00	0.48	$\text{cal K}^{-1} \text{mol}^{-1}$
Energy spent to raise blowdown to 25°C	5.80	1.24	5.80	5.80	1.24	5.80	1.24	kJ L^{-1}
Energy spent to vaporize at 25°C at vapor pressure	40.65	35.20	40.65	40.65	35.20	40.65	35.20	kJ mol^{-1}
Energy spent to vaporize at 25°C at vapor pressure	0.63	0.24	0.63	0.63	0.24	0.63	0.24	kW hr L^{-1}
Volume of blowdown H2O + solute + H2O of hydration (if any)	365	325	485	251	342	253	405	290 L hr^{-1}
Volume of solvent in blowdown	54	192	178	210	210	201	179	210 L hr^{-1}
Molecular elevation of boiling point(Ka)	0.512	0.830	0.512	0.512	0.512	0.830	0.512	0.830
Barometric Correction	0.073	0.112	0.073	0.073	0.073	0.112	0.073	0.112
Elevation of the boiling point	3.7	8.2	3.0	3.7	15.7	8.1	2.8	5.5 $^{\circ}\text{C}$
Energy required to raise boiling point	0.856	0.407	0.701	0.852	3.641	0.403	0.656	0.274 kW hr L^{-1}
Energy spent to vaporize liquid in blowdown 25°C	34.3	46.5	112.2	132.3	134.0	48.6	112.8	50.8 kW hr^{-1}
Daily energy spent to vaporize liquid in blowdown@ 25°C	823	1115	2693	3175	3217	1167	2708	1218 kWh day^{-1}
Power consumption to run pressure pump for Solvent Chamber	2.00	2.00	2.00	2.00	2.00	2.00	2.00	kWh day^{-1}
Power consumption to run vacuum pump for solvent recycle	2.00	2.00	2.00	2.00	2.00	2.00	2.00	kWh day^{-1}
Total power consumption internally	827	1119	2697	3179	3221	1171	2712	1222 kWh day^{-1}
Total power consumption internally	0.57	0.78	1.87	2.21	2.24	0.81	1.88	0.85 kW min^{-1}
Temperature in Solvent Chamber at vapor pressure	22	22	22	22	22	22	22	22 $^{\circ}\text{C}$
Temperature in Blowdown Receiving Chamber	25	25	25	25	25	25	25	25 $^{\circ}\text{C}$
Temperature in Condenser at 760 mm Hg	22	22	22	22	22	22	22	22 $^{\circ}\text{C}$
Solvent Chamber operating pressure	166	166	166	209	209	166	209	166 bar

FIG. 10A
 FIG. 10B

(B)

(A)

Solvent Chamber operating chamber	2400	2402	2402	3025	3025	2402	3025	2402	psi
Pressure Chamber operating pressure	207	207	207	250	250	207	250	207	bar
Pressure Chamber operating pressure	3000	3002	3002	3625	3625	3002	3625	3002	psi
Temperature in Pressure Chamber	22	22	22	22	22	22	22	22	°C
Pressure differential across semipermeable membrane (SM)	41	41	41	41	41	41	41	41	bar
Pressure differential across semipermeable membrane (SM)	600	600	600	600	600	600	600	600	psi
Pressure in bladder-type nitrogen pressure buffer tank	207	207	207	250	250	207	250	207	bar
Pressure in bladder-type nitrogen pressure buffer tank	3000	3000	3000	3625	3625	3000	3625	3625	psi
Pressure in Blowdown Receiving Chamber	0.04	0.27	0.04	0.04	0.04	0.27	0.04	0.27	bar
Flowrate of hydraulic fluid to hydraulic motor	101	90	135	70	95	70	113	81	ml sec ⁻¹
Torque	216	216	216	261	261	216	261	216	ft. lbs
Revolutions per time	62	55	82	55	58	42.9	69	49	rpm
Horsepower, bhp (U.S.)	2.55	2.27	3.38	2.74	2.89	1.76	3.41	2.02	HP min ⁻¹
Horsepower, bhp (U.S.)	152.81	136.16	202.89	164.44	173.10	105.81	204.81	121.39	HP h ⁻¹
Efficiency converting torque to electricity	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Kilowatts output (min)	1.71	1.52	2.27	1.84	1.94	1.18	2.29	1.36	kW min ⁻¹
Kilowatts output (hour)	102.56	91.38	136.17	110.36	116.17	71.01	137.45	81.47	kW h ⁻¹
Kilowatts output (day)	2461	2193	3268	2649	2788	1704	3299	1955	kWh day ⁻¹
Net kilowatts output (day)	1634	1074	571	-530	-433	533	587	733	kWh day ⁻¹
Net kilowatts output (mon)	49,343	32,442	17,239	(16,008)	(13,063)	16,109	17,734	22,137	kWh mon ⁻¹
Electrical consumption (all electric home)	5000	5000	5000	5000	5000	5000	5000	5000	kWh mon ⁻¹
Home serviced	9.9	6.5	3.4	-3.2	-2.6	3.2	3.5	4.4	

FIG. 10B